

WHAT IS CLAIMED IS:

1. A method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride comprising the steps of:

combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;

heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;

feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification; and

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.

2. The method of claim 1 wherein the temperature that favors partial esterification over complete esterification is greater than about 70°C.

3. The method of claim 2 wherein the temperature that favors partial esterification over complete esterification is between about 90°C and about 130°C.

4. The method of claim 1 wherein the temperature that favors decarboxylation over esterification is above about 190°C.

5. The method of claim 4 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.

6. The method of claim 1 wherein the alcohol has a boiling point between about 100°C and about 230°C.

7. The method of claim 1 wherein the alcohol has the general formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.

8. The method of claim 1 wherein said step of combining the tetrabromophthalic anhydride and an alcohol occurs in the presence of an inert solvent.
9. The method of claim 8 wherein the inert solvent is an ether having a boiling point between about 160°C and 230°C.
10. The method of claim 1 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.
11. The method of claim 1 wherein the tetrabromobenzoate ester-containing product comprises at least about 85% tetrabromobenzoate ester.
12. The method of claim 1 wherein the at least one reactor contains tetrabromobenzoate ester when feeding the tetrabromophthalate half-ester intermediate mixture to at least one heated reactor.
13. The method of claim 1 wherein the at least one reactor includes a plurality of heated reactors connected to one another in series.
14. The method of claim 13 wherein the first of the plurality of heated reactors contains tetrabromobenzoate ester when the tetrabromophthalate half-ester intermediate mixture is fed to at least one heated reactor.
15. The method of claim 1 wherein said step of feeding the tetrabromophthalate half-ester intermediate mixture is continuous such that the half-ester intermediate mixture is continuously fed to the at least one reactor, while the tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.
16. A flame retardant mixture comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 1.

17. A flame retarded polymer resin comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 1.

18. A flame retarded polyvinyl chloride or polyurethane comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 1.

19. A method for the preparation of tetrabromobenzoate esters comprising the steps of:

feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor wherein the first of the at least one reactor contains a product mixture, the product mixture comprising tetrabromobenzoate ester, the at least one reactor having a temperature that favors decarboxylation over esterification; and

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.

20. The method of claim 19 wherein said product mixture includes a decarboxylation catalyst.

21. The method of claim 20 wherein the decarboxylation catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

22. The method of claim 19 said step of feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor further includes feeding a decarboxylation catalyst to the at least one reactor.

23. The method of claim 22 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

24. The method of claim 19 wherein the temperature that favors decarboxylation over esterification is above about 190°C.

25. The method of claim 24 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.

26. The method of claim 19 wherein the alcohol has a boiling point between about 100°C and about 230°C.

27. The method of claim 19 wherein the alcohol has the general formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.

28. The method of claim 19 further comprising the step of adding an inert solvent to the at least one reactor, the inert solvent having a boiling point above about 160°C.

29. The method of claim 28 wherein the inert solvent is an ether.

30. The method of claim 19 wherein the at least one reactor includes a plurality of reactors connected in series to one another.

31. The method of claim 19 further comprising the step of combining the either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to form a first reaction mixture prior to said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol.

32. The method of claim 19 wherein said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to at least one reactor is continuous such that either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol are continuously fed to the at least one reactor, while the

tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.

33. A flame retardant mixture comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 19.

34. A flame retarded polymer resin comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 19.

35. A flame retarded polyvinyl chloride or polyurethane comprising a tetrabromobenzoate ester of the tetrabromobenzoate ester-containing compound produced by the process of claim 19.